Amendments to the Claims

1. (Currently Amended) ~~A~~ An optical coherence tomography method ~~of processing an optical coherence tomography signal~~ using an optical coherence tomography system having a light source, a detector, an analog to digital converter and a processor comprising:

generating an optical coherence tomography signal;

digitizing ~~an~~ the analog optical coherence tomography signal to provide digital data points; and

processing the digital data points representing a portion of the signal in the time domain using non-linear regression with a sinusoidal model to fit the sinusoidal model to the digital data points.

2. (Original) A method as recited in claim 1 wherein the sinusoidal model is:

$$I(t) = A \sin(2\pi f_0 t + \phi_0)$$

where *I* is the intensity of the optical coherence tomography signal, A is the amplitude, f_0 is the frequency of the signal and ϕ_0 is the phase lag.

3. (Original) A method as recited in claim 1 wherein the sinusoidal model is:

$$I(t) = (A + \alpha t)\sin(2\pi(f_0 + \sigma t)t + \phi_0)$$

where I is the intensity of the optical coherence tomography signal, A is the amplitude, f_0 is the frequency of the signal, ϕ_0 is the phase lag, α models changes in amplitude and σ models a rate of change of frequency.

4. (Original) A method as recited in claim 1 wherein the non-linear regression is optimized for a known frequency range.

5. (Original) A method as recited in claim 1 wherein the processing determines the coefficients of the sinusoidal model including amplitude and frequency.

6. (Original) A method as recited in claim 5 wherein the processing eliminates components that fail to converge correctly.

7. (Original) A method as recited in claim 1 wherein the digital data points represent a portion of the signal that is less than a full cycle of a wave of the signal.

8. (Canceled).

9. (Previously Presented) A method as recited in claim 11 wherein the frequency of the signal is within a known frequency range.

10. (Original) A method as recited in claim 9 wherein the processing is optimized for the known frequency range.

11. (Currently Amended) ~~A~~ An optical coherence tomography method using an optical coherence tomography system having a light source, a detector, an

analog to digital converter and a processor ~~of processing an image signal representing an image of materials that are changing or moving during the imaging~~ comprising:

generating an image signal representing an image of materials that are changing or moving during imaging;

receiving digital data points representing a portion of the image signal;

processing the digital data points in the time domain by non-linear fitting of a sinusoidal model to the digital data to determine a frequency of the signal,

wherein the digital data points represent a portion of the signal that is less than a full cycle of a wave of the signal.

12. (Previously Presented) A method as recited in claim 11 wherein the sinusoidal model is

$$I(t) = A\sin(2\pi f_0 t + \phi_0)$$

where I is the intensity of the optical coherence tomography signal, A is the amplitude, f_0 is the frequency of the signal and ϕ_0 is the phase lag.

13. (Previously Presented) A method as recited in claim 11 wherein the sinusoidal model is:

$$I(t) = (A + \alpha t)\sin(2\pi(f_0 + \sigma t)t + \phi_0)$$

where I is the intensity of the optical coherence tomography signal, A is the amplitude, f_0 is the frequency of the signal, ϕ_0 is the phase lag, α models changes in amplitude and σ models a rate of change of frequency.

14. (Previously Presented) A method as recited in claim 11 wherein the processing eliminates components that fail to converge correctly.

15. (Canceled).

16. (Currently Amended) A method of processing a signal in the time domain to determine a frequency of the signal where the frequency is within a known range using a system having a digital to analog converter and a processor comprising:

digitizing the signal to provide digital data points; and

processing the digital data points representing a portion of the signal in the time domain using non-linear regression with a sinusoidal model optimized for the known frequency range to determine parameters of the sinusoid fitting the digital data, the parameters including frequency,

wherein the digital data points represent a portion of the signal that is less than a full cycle of a wave of the signal.

17. (Previously Presented) A method as recited in claim 16 wherein the processing eliminates components that fail to converge correctly.

18. (Previously Presented) A method as recited in claim 16 wherein the sinusoidal model is

$$I(t) = A \sin(2\pi f_0 t + \phi_0)$$

where I is the intensity of the optical coherence tomography signal, A is the amplitude, f_0 is the frequency of the signal and ϕ_0 is the phase lag.

19. (Previously Presented) A method as recited in claim 16 wherein the sinusoidal model is:

$$I(t) = (A + \alpha t)\sin(2\pi(f_0 + \sigma t)t + \phi_0)$$

where I is the intensity of the optical coherence tomography signal, A is the amplitude, f_0 is the frequency of the signal, ϕ_0 is the phase lag, α models changes in amplitude and σ models a rate of change of frequency.

20. (Previously Presented) A method as recited in claim 16 wherein the parameters include amplitude and a rate of change of frequency.